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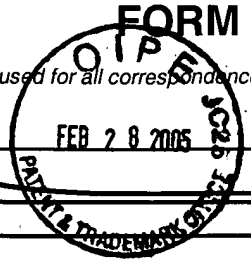
TRANSMITTAL FORM

(to be used for all correspondence after initial filing)



Application Number	10/002,746
Filing Date	November 2, 2001
Inventor(s)	Arnab DAS et al.
Group Art Unit	2685
Examiner Name	Thuan T. Nguyen
Attorney Docket Number	29250-002099/US

ENCLOSURES *(check all that apply)*

- ☒ Fee Transmittal Form
- ☒ Fee Attached
- ☐ Amendment
- ☐ After Final
- ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request (contained in Notice of Appeal)
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Response to Missing Parts/ Incomplete Application
- ☐ Response to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Assignment Papers *(for an Application)*
- ☐ Letter to the Official Draftsperson and _____ Sheets of Formal Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
- ☐ After Allowance Communication to Group
- ☐ LETTER SUBMITTING APPEAL BRIEF AND APPEAL BRIEF (w/clean version of pending claims)
- ☒ Appeal Communication to Group *(Notice of Appeal, Brief, Reply Brief)*
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) *(please identify below):*

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm *or* Individual name	Harness, Dickey & Pierce, P.L.C.	Attorney Name John E. Curtin	Reg. No. 37,602
Signature			
Date	February 28, 2005		

PTO/SB/17 (12-04)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

FEE TRANSMITTAL for FY 2005

Effective 10/01/2004. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 500

Complete if Known	
Application Number	10/002,746
Filing Date	November 2, 2001
First Named Inventor	Arnab DAS
Examiner Name	Thuan T. Nguyen
Art Unit	2685
Attorney Docket No.	29250-002099/US

METHOD OF PAYMENT *(check all that apply)*

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☒ Deposit Account:

Deposit Account Number: 08-0750

Deposit Account Name: Harness, Dickey & Pierce, PLC

The Director is authorized to: *(check all that apply)*
☐ Charge fee(s) indicated below ☐ Credit any overpayments
☐ Charge any additional fee(s) during the pendency of this application
☐ Charge fee(s) indicated below, **except for the filing fee** to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1011	300	2011	150	Utility filing fee	
1012	200	2012	100	Design filing fee	
1013	200	2013	100	Plant filing fee	
1014	300	2014	150	Reissue filing fee	
1005	200	2005	100	Provisional filing fee	

SUBTOTAL (1) ($) 0

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

			Extra Claims		Fee from below		Fee Paid
Total Claims		-20 ** =	0	X		=	0
Independent Claims		-3 ** =	0	X		=	0
Multiple Dependent						=	0

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	50	2202	25	Claims in excess of 20
1201	200	2201	100	Independent claims in excess of 3
1203	360	2203	180	Multiple dependent claim, if not paid
1204	200	2204	100	** Reissue independent claims over original patent
1205	50	2205	25	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 0

***or number previously paid, if greater; For Reissues, see above*

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	120	2251	60	Extension for reply within first month	
1252	450	2252	225	Extension for reply within second month	
1253	1020	2253	510	Extension for reply within third month	
1254	1,590	2254	795	Extension for reply within fourth month	
1255	2,160	2255	1080	Extension for reply within fifth month	
1401	500	2401	250	Notice of Appeal	
1402	500	2402	250	Filing a brief in support of an appeal	500
1403	1000	2403	500	Request for oral hearing	
1452	500	2452	250	Petition to revive – unavoidable	
1453	1500	2453	750	Petition to revive – unintentional	
1501	1400	2501	700	Utility issue fee (or reissue)	
1502	800	2502	400	Design issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17 (q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	790	2809	395	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	790	2810	395	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	790	2801	395	Request for Continued Examination (RCE)	
Other fee (specify) ____					

*Reduced by Basic Filing Fee Paid SUBTOTAL (3) ($)500

4. SEARCH/EXAMINATION FEES

1111	500	2111	250	Utility Search Fee
1112	100	2112	50	Design Search Fee
1113	300	2113	150	Plant Search Fee
1114	500	2114	250	Reissue Search Fee
1311	200	2311	100	Utility Examination Fee
1312	130	2312	65	Design Examination Fee
1313	160	2313	80	Plant Examination Fee
1314	600	2314	300	Reissue Examination Fee

SUBTOTAL (4) ($)0

SUBMITTED BY				Complete *(if applicable)*	
Name (Print/Type)	John E. Curtin	*Registration No. (Attorney/Agent)*	37,602	*Telephone*	(703) 668-8000
Signature				*Date*	February 28, 2005

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appeal No. _____

Appellants:	Arnab DAS et al.
Application No.:	10/002,746
Group No.:	2685
Filed:	November 2, 2001
Examiner:	Thuan T. Nguyen
For:	VARIABLE RATE CHANNEL QUALITY FEEDBACK IN A WIRELESS COMMUNICATION SYSTEM
Attorney Docket No.:	29250-002099/US

BRIEF ON APPEAL ON BEHALF OF APPELLANT

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314
Mail Stop Appeal Brief - Patents

February 28, 2005

TABLE OF CONTENTS

BRIEF ON BEHALF OF APPELLANT

In support of the Notice of Appeal filed January 10, 2005, appealing the Final Rejection mailed May 5, 2004, Appellant hereby provides the following remarks.

I. REAL PARTY IN INTEREST

The present application is assigned to Lucent Technologies Inc., by an Assignment recorded on November 2, 2001, Reel 012354, Frame 0991.

II. RELATED APPEALS AND INTERFERENCES

On January 10, 2005 the Appellants filed a Petition to Revive an Unintentionally Abandoned Application ("Petition"). Appellants are presently awaiting a decision on the Petition.

III. STATUS OF THE CLAIMS

The claims reproduced in the attached Appendix A are the claims on Appeal. Each of these claims is currently pending in the application.

IV. STATUS OF ANY PETITIONS OR AMENDMENTS FILED SUBSEQUENT TO THE FINAL REJECTION

Initially, Appellants refer the Board to the comments made in Section II above.

In addition, a Response After Final dated August 6, 2004 ("Response") was filed with the U.S. Patent and Trademark Office in response to the Final Rejection. Appellants presume this Response will be entered and considered if their Petition is granted.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The invention relates generally to wireless communication systems and, more particularly, to providing channel quality information from a mobile station to a base station in such systems.

In wireless communication systems, an air interface is used for the exchange of information between a mobile station and a base station or other communication system equipment. The air interface typically comprises a plurality of communication channels. In wireless transmission, a channel is time varying due to fading, mobility, and so on. More specifically, channel quality is affected by factors such as distance between the mobile and base station, speed of the mobile station, interference, and the like. Given the limited resources (e.g., bandwidth) of wireless transmission as well as the large number of mobile stations supported by a base station at any given time (and, therefore, competing for those limited resources) it is therefore important to maximize throughput of a wireless communication system. For example, in a time-multiplexed system in which the transmission time interval spans one or more time slots, system throughput can be maximized by allowing a user with the best channel quality to transmit ahead of users with comparatively low channel quality.

In one known arrangement, a mobile station performs a rate calculation based on measurements of a pilot signal from the base station once every time slot and then reports back the rate at which it is going to receive data from the base station. Alternatively, the mobile station can send channel quality feedback information to the base station. The base station can then select the appropriate rate corresponding to that channel quality. In general, the purpose of sending channel quality feedback information to the base station is to inform the base station of the transmission rate that best matches the current conditions (e.g., quality) of the channel at the present time. (See Specification, page 1.)

FIG. 1 (Appendix B) shows one example of wireless transmission based on the well-known 1x-EV-DO (data only) standard in which a so-called fast rate adaptation scheme is used

to maximize the system throughput by exploiting time varying channel conditions. More specifically, FIG. 1 shows a signaling diagram between a base station (BS) and a mobile station (MS). The data channel 100 for the downlink from the base station to the mobile station is divided into time slots 101-117, each of which has a duration τ. In the case of the 1x-EV-DO standard, the duration τ would be 1.67 milliseconds. In the example shown in FIG. 1, time slots 101-106 and 110-115 are not carrying transmissions from the base station to the mobile station. However, the base station is transmitting to the mobile station during time slots 107-109 and during time slots 116-117.

From the perspective of the mobile station, the uplink channel 200 is also divided into time slots 201-217, each of which has a duration τ. As shown in FIG. 1, the calculation and reporting rate for the dedicated control channel 200 (by the mobile station) is performed according to well-known methods once every time slot 201-217. More specifically, channel quality information (e.g., transmission rate in 1x-EV-DO systems) is transmitted via communications 151-165. For example, mobile station is transmitting channel quality information to the base station via communications 151-153 during time slots 201-203 indicating that rate R1 is the desired rate of transmission based on the channel quality. As shown in this example, this rate information is received at the base station during time slots 103-105, so there is some delay with respect to the calculation of the rate in the mobile station during a time slot and the subsequent reporting of that rate to the base station. In slot 204, the mobile station detected a change in channel quality and reported back to the base station that transmission should occur at rate R2. This channel quality feedback is received by the base station during its time slot 106. Because the base station is sending a transmission to the mobile station during

time slots 107-109 and because the base station is receiving channel quality feedback indicating rate R2 as the desired rate (e.g., R2 reported by mobile station during its time slots 204-206 and received by the base station during its time slots 106-108), the transmission by the base station during time slots 107-109 is therefore sent at rate R2. In time slots 207-212, the mobile station is reporting rate RI as the desired rate, but no transmissions are occurring from the base station during time slots 110-115. As shown, the mobile station reports rate R3 as the desired rate during time slots 213-216, which are received at the base station starting at time slot 115. Because the base station starts sending another transmission during time slot 116, this transmission therefore is sent at rate R3 based on the channel quality feedback received from the mobile station. (See Specification, pages 1-2.)

Another approach to providing rate feedback is described in U.S. Patent Application Serial No. 09/716,106, entitled *"Asymmetric Rate Feedback and Adjustment System for Wireless Communications"* and filed on November 17, 2000, the subject matter of which is incorporated herein by reference in its entirety. As described, rate calculation and prediction is still being performed at every time slot, but the reporting of this rate feedback from a mobile station to the base station occurs every third time slot. In this manner, the reporting of rate feedback from a plurality of mobile stations can be staggered such that each mobile station is only sending rate feedback every third time slot, but the base station is receiving rate feedback at each time slot (i.e., from different mobile stations).

There are several disadvantages to these constant rate feedback approaches. Performing rate calculation and prediction in every time slot uses up a large amount of processing overhead at the mobile station. Providing rate feedback to the base station at every time slot uses a large

amount of transmission overhead and, because rate feedback is being provided regardless of whether there is a transmission being sent from the base station, transmission resources are therefore being inefficiently used. Even if rate feedback is provided at a slower rate (e.g., every third time slot), there is still inefficient use of resources because the rate feedback is being provided regardless of whether the base station is transmitting.

To overcome the problems inherent in existing approaches, the present invention substantially reduces the processing of: (i) overhead for rate calculation/prediction; and (ii) transmission overhead for rate feedback in wireless transmissions, by varying the feedback rate for reporting channel quality information from a mobile station to a base station as a function of the presence or absence of a transmission from the base station to the mobile station.

More specifically, the present invention provides channel quality information (i.e., feedback) from the mobile station to the base station at a variable rate, such that the feedback rate is faster when the base station is transmitting to the mobile station and slower when there is no transmission occurring. Wireless resources can be more efficiently used because the rate at which the mobile station reports channel quality to the base station is varied as a function of the absence or presence of transmission from the base station.

In contrast, when the base station is not transmitting to the mobile station, the feedback rate for reporting channel quality from the mobile station is at a slower rate, which, in turn, frees up wireless resources that can be used for other purposes, e.g., for transmissions between the mobile station and the base station. When the base station is transmitting to the mobile station, the rate of reporting channel quality from the mobile station is increased so that rate adaptation can be carried out more accurately by the base station. Moreover, because of the short duration

of time slots in wireless transmission, it is highly unlikely that the rate or channel quality will change over a period of a few time slots under most operating conditions. (See Specification, pages 3-4.)

FIG. 2 (Appendix C) shows one exemplary embodiment for providing variable rate channel quality feedback according to the principles of the invention. By way of example only, this scheme will be described in the context of wireless transmission according to the 1x-EV-DO (data only) standard, but the teachings set forth herein are not at all limited to just this particular wireless implementation.

More specifically, FIG. 1 (Appendix B) shows a signaling diagram between a base station (BS) and a mobile station (MS). The data channel 300 for the downlink from the base station to the mobile station is divided into time slots 301-317, each of which has a duration τ, e.g., 1.67 milliseconds. In the example shown in FIG. 2 (Appendix C), time slots 301-306 and 310-315 are not carrying transmissions from the base station to the mobile station. However, the base station is transmitting to the mobile station during time slots 307-309 and during time slots 316-317. From the perspective of the mobile station, the uplink control channel 400 is also divided into corresponding time slots 401-417, each of which has a duration τ.

As shown in FIG. 2, the calculation and reporting of the rate for the dedicated control channel 400 by the mobile station is performed using a variable rate in contrast to the prior art methods. In general, when there is no data transmission from the base station (e.g., time slots 301-306), the channel quality information (e.g., rate information) is sent from the mobile station every two (2) slots as shown by communications 352, 354, 361, 363, and 365. As previously described, there is a delay factor with respect to the uplink transmission (from the mobile station)

and the downlink transmission (from the base station). When the mobile station is receiving a transmission over the forward link (e.g., downlink from the base station), the channel quality feedback is sent every slot as shown by communications 356-359. As such, the rate at which channel quality feedback is provided when there is a transmission from the base station is faster than the rate at which channel quality feedback is provided when there is no transmission from the base station. (See Specification, pages 4-5.)

More specifically, FIG. 2 depicts the mobile station transmitting channel quality information (e.g., rate information) to the base station via communications 352 at time slot 402 indicating that rate R1 is the desired rate of transmission based on the channel quality. As shown in this example, this rate information is received at the base station during time slot 304 because of the aforementioned delay factor. In slot 404, the mobile station detected a change in channel quality-and~feported back to the base station that transmission should occur at rate R2. This channel quality feedback is received by the base station during its time slot 306. Because the base station is sending a transmission to the mobile station during time slots 307-309 and because the base station is receiving channel quality feedback indicating rate R2 as the desired rate (e.g., R2 reported by mobile station in time slot 404 and received by the base station in time slot 306), the transmission by the base station during time slots 307-309 is therefore sent at rate R2. Because the base station is now transmitting data to the mobile station during time slots 307-309, the mobile station is adapted to send the channel quality feedback at a faster rate (e.g., every time slot) for the corresponding time slots 407-409, e.g., as shown by communications 357-359. It should be noted that, because transmission did not start until time slot 307 by the base station and because of the delay factor, the channel quality feedback information indicating

rate R2 via communication 356 is still being sent at the slower rate (e.g., every two (2) slots). The faster rate of reporting channel quality feedback does not begin until time slots 407-409 at the mobile station which correspond to time slots 307-309 where transmission is occurring from the base station. (See Specification, pages 5-6.)

When transmission from the base station ends and there is no further transmission, the mobile station resumes its reporting of channel quality information at the slower rate (e.g., every two (2) slots) as shown by communication 361. For example, there is no transmission from the base station in time slot 310, so the next report of rate information from the mobile station is sent at time slot 411, e.g., two time slots after time slot 409, which corresponded to time slot 309 when transmission ended from the base station.

It should be noted that the feedback rate for transmitting the channel quality information and the point in time when the information is reported (e.g., at the leading edge, during, or at the trail edge of the time slot) are all matters of design choice. As such, the example shown in FIG. 2 where the slower first rate is every two (2) slots and the faster second rate is every one (1) slot, and where the channel quality information is sent at the end of the corresponding time slot at the mobile station are all meant to be illustrative and not limiting in any way. However, those skilled in the art will appreciate that a large value for the reporting interval (time between the reports of channel quality from the mobile station) will reduce the channel quality feedback overhead. However, the resulting slower rate channel quality feedback may also result in large errors in channel quality estimates at the base station and performance degradation. Again, these are matters of design choice that are well understood by one skilled in the art.

According to another aspect of the invention, there are numerous implementations for providing rate feedback at a faster rate after detection of a transmission from the base station. For example, upon detection of a transmission from the base station, the mobile station can report channel quality information at a second rate for a prescribed duration after the detection of the transmission. In this manner, the rate feedback may therefore be provided at a faster rate for a period of time even though transmission from the base station has ended. By way of example, a mobile station may report rate feedback every 100 milliseconds in the absence of a transmission. Upon detection of a transmission from the base station, the mobile station can then provide rate feedback every 20 milliseconds for a prescribed period of time regardless of whether transmission ends from the base station. At the end of that prescribed period of time and assuming there is an absence of a transmission, the mobile station would then resume reporting of rate feedback at the first rate of 100 milliseconds (e.g., the slower rate). In yet another example, the mobile station, upon detection of a transmission from the base station, can report channel quality information at a plurality of rates over a prescribed time period after detection of the transmission, wherein the plurality of rates are different than the first rate. More specifically, upon detection of a transmission, the mobile station would begin reporting rate feedback at a second rate that is faster than the first rate for a prescribed time period. At the end of this prescribed time period and assuming there is an absence of a transmission, the mobile station could then report rate feedback at a third rate that is different than the first and second rates, and so on. Other variations will also be apparent to those skilled in the art and are contemplated by the teachings herein.

On the downlink transmission from the base station, the total capacity is shared by a large number of mobile stations. Due to the bursty nature of the data traffic, the mobile stations are active only a fraction of the time. Therefore, an increased rate of channel quality feedback during the time of data transmission for a given mobile station will not result in any significant increase of overhead. The fast channel quality feedback rate during a transmission from the base station will result in better channel quality estimates that will be used for appropriate selection of transport format for new transmissions and retransmissions. Note that due to the bursty nature of the traffic, when a transmission is sent to a mobile station, it is likely that more transmissions or retransmissions will occur to the same mobile station within a short period of time. (See Specification, pages 6-7.)

According to another aspect of the invention, the increased feedback rate during data transmission also helps to estimate the quality of a transmission so that, in case of retransmissions, the appropriate amount of redundancy or repetition can be included in the retransmissions. This aspect of the invention is advantageous since it is possible that a transmission might initially start from the base station with a less accurate transmission rate (e.g., not matching up to the actual, current channel quality) since a slower feedback rate is being used before transmission commences. So, although rate adaptation will be accurately performed once the feedback rate increases (e.g., to every time slot), there may be initial portions of the transmission that will require retransmission under certain circumstances. As such, the ability to estimate the quality of the transmission in the current feedback scheme will be helpful for the retransmission process. For example, these estimates can be used for selecting an appropriate

transport format (e.g., modulation, number of codes, etc.) for retransmissions for the corresponding previous transmissions.

The embodiment shown in FIG. 3 (Appendix D) helps to illustrate this aspect of the invention. Data channel 500 represents the downlink (forward link) from the base station to the mobile station and is shown as comprising two (2) millisecond frames or transmission time intervals (TTIs) 506. More specifically, data channel 500 shows multiple transmissions for the same user in data blocks 501-505, wherein data blocks 501-504 contain new transmissions while data block 505 contains a retransmission corresponding to the transmission in data block 501. As in the preceding embodiments, control channel 600 represents the uplink (reverse link) from the mobile station. The example shown in FIG. 3 depicts two (2) millisecond transmission time intervals 602, each of which comprises three (3) time slots 601 of .67 milliseconds each. This format is characteristic of the aforementioned HSDPA standard.

As in the preceding embodiments, the feedback rate for channel quality information from the mobile station is at a slower rate when there is no data transmission, e.g., as shown for time periods 603 and 604. However, when the mobile station detects transmission from the base station, the channel quality feedback rate is increased to once every transmission time interval (HI), e.g., two (2) milliseconds, as shown by communications 610-614. In this example, the transport format for the retransmission 505 for data block A (RTX A) can be based on the most recent channel quality feedback (i.e. *m)* as well as the channel quality estimates *k* and *I* that, in turn, provide an estimate of the quality of the previous transmission 501 of data block A (NTX A). Accordingly, the appropriate rate, modulation, and coding scheme can be derived

more accurately for the retransmission according to the principles of the invention. (See Specification, pages 7-8.)

In another exemplary embodiment of the invention, the feedback rate for channel quality information from the mobile station is varied as a function of the number of base stations that the mobile station is communicating with. In particular, this embodiment is particularly advantageous when handling so-called "soft handoffs" in CDMA wireless communication systems. As is well known, a "handoff" is the act of transferring support of a mobile station from one base station to another base station. A "soft handoff" occurs when the mobile station makes a connection to a new base station (e.g., cell) before leaving the current base station (e.g., cell) that is supporting the mobile station. In particular, a "soft handoff" is designed to ensure that there is connectivity with the old (e.g., current) base station while the new base station has been assigned to take control over the communication link with. the mobile station. As such, a mobile station may be simultaneously communicating with multiple base stations at a given instant of time during such handoffs. According to the principles of the invention, the feedback rate for reporting channel quality information is adapted or otherwise varied to be slower when the mobile station is communicating with only one base station and faster during a "soft handoff" when the mobile station is communicating with two or more base stations. By increasing the rate of reporting quality information during "soft handoffs, the base stations can effectively and accurately perform the appropriate rate adaptations during such critical times such as "soft handoffs" and the like. It should be noted that other variations to this aspect of the invention will be apparent to those skilled in the art and are therefore contemplated by the teachings herein.

In general, the foregoing embodiments are merely illustrative of the principles of the invention. Those skilled in the art will be able to devise numerous arrangements, which, although not explicitly shown or described herein, nevertheless embody those principles that are within the scope of the invention. For example, although the invention was described in the context of wireless transmission according to the CDMA2000 1x-EV-DO standard, the invention could also be applicable to other known or to-be-developed wireless transmission standards. For example, the teachings of the invention may be applied to wireless transmission according to the well-known High Speed Downlink Packet Access (HSDPA) specification in the Universal Mobile Telecommunication System (UMTS) standard. Other modifications or substitutions will be apparent to those skilled in the art and are contemplated by the teachings herein. (See Specification, pages 9-10.)

Appellants respectfully note that the above summary of the invention, including any indication of reference numerals, drawings, figures, paragraphs, page numbers, etc. (collectively referred to as "descriptions" of the application) have been provided solely to comply with the U.S. Patent and Trademark Office's rules concerning the appeal of the claims of the present application. As such, the descriptions above are merely exemplary and should not be construed to limit the claims of the present application in any way whatsoever.

VI. ISSUES TO BE REVIEWED ON APPEAL

(i) Whether claims 4-15 are anticipated by U.S. Patent No. 6,067,458 to Chen ("Chen").

VII. ARGUMENTS

A. The Section 102(b) Rejections

Claims 1 and 4-15 were rejected under 35 U.S.C. §102(b) as being anticipated by Chen. Appellants respectfully traverse these rejections for the reasons set forth below.

i. Claims 13-15

Appellants submit that claims 13-15 are not anticipated by Chen. As a preliminary matter, neither the Final Office Action nor the previous Office Action sets forth with any particularity how the specific limitations recited in these claims are anticipated by Chen. In both Office Actions, the rejection of claims 13-15 was supported only by reference to the reasons used for rejection of claims 1-10 in the Office Action without any acknowledgement of the different, additional limitations in claims 13-15. Secondly, the Final Office Action did not address arguments provided in Appellants' response (Appendix E) to a previous non-final Office Action with regard to the distinctions between claims 13-15 and the Chen reference.

Most importantly, Appellants submit that claims 13-15 are not anticipated by Chen because each and every element of claims 13-15 is not described, either expressly or impliedly by Chen. For example, there are absolutely no teachings in Chen that either expressly or impliedly disclose varying the rate for reporting channel quality information as a function of the number of base stations that the mobile is communicating with, as recited in Appellants' claim 13. This feature of the claimed invention, which is particularly advantageous for handling "soft handoffs", is supported in the specification, see, e.g., pages 11-13, *infra* or page 9, lines 1-22 in the specification.

Because Chen does not disclose each of the limitations recited in claim 13, Appellants submit that the Chen reference cannot anticipate claim 13. In addition, because claims 14 and 15 depend from claim 13, these dependent claims are therefore also believed to be allowable for the same reasons set forth above for claim 13 as well as for other novel features therein. Accordingly, Appellants respectfully request that the board reverse the decision of the Examiner and grant allowance of claims 13-15.

ii. Claims 1 and 4-12

Appellants submit that claims 1 and 4-12 are not anticipated by Chen because each and every element of claims 1 and 4-12 is not described, either expressly or impliedly by Chen. Contrary to the Examiner's assertion otherwise, Appellants submit that Chen does not describe, either expressly or impliedly, at least the following limitations recited in Appellants' claim I (and claim 11 which has similar limitations):

- mobile station reports channel quality information at a first rate in the absence of a reception of a data transmission from the base station and
- upon detection of a reception of a data transmission from the base station, the mobile station reports channel quality information at a second rate for a prescribed duration.

Chen appears to be concerned with adjusting the appropriate power level for transmitting data in order to avoid data loss, to extend battery life in a mobile, and so on. Power control, as described by Chen, is important especially for higher rate data transmissions because transmitting data at higher rates requires higher power (see, e.g., col. 3, lines 40-47 and col. 6, lines 49-59). In one embodiment, Chen describes a mobile (receiver) being instructed by the base station to send more power control information (e.g., at a higher rate) for a specified time

period preceding the data transmission, so that appropriate adjustments to power can be made by the base station before sending the high rate data transmission to the mobile (see, e.g., col. 3, lines 48-54). In yet another embodiment, Chen describes the case where: 1) the link can be operating at the idle rate; 2) that data is then received at the base station for *subsequent* transmission to the mobile; 3) that the base station instructs the mobile to send more power control information (e.g., on the reverse link); and 4) thereafter, the base station adjusts its power level and then sends the data transmission at a higher rate to the mobile (see, e.g., col. 11, line 40 to col. 13, line 10).

These teachings are different from Appellants' claimed invention. As recited in claim 1, a mobile sends channel quality feedback to a base station at different rates depending on whether there is an absence or presence of a data transmission from the base station to the mobile. That is, the trigger for changing the rate of channel quality feedback from the mobile to the base station is whether there is a data transmission received by the mobile from the base station. Using the actual data transmission from the base station as a trigger for the mobile station to change its rate of transmitting channel quality information back to the base station, as claimed by Appellants, is different from the teachings of Chen. In Chen, the rate of transmission of power control information over the reverse link (assuming for argument purposes that the power control information is "feedback") is varied as a function of the mobile receiving an instruction from the base station before (i.e., in preparation of) the base station sending the data transmission to the mobile. Accordingly, Chen does not teach varying feedback from the mobile based on the absence or presence of a data transmission from the base station to the mobile.

Furthermore, Appellants respectfully submit that Chen fails to disclose or suggest, contrary to the Examiner's assertion otherwise, a mobile station that, upon detection of a reception of a data transmission, reports channel quality information at a second rate for a prescribed duration. In particular, Chen only teaches that the bandwidth, and hence the rate of transmission, of power control information from the mobile station is increased in response to the instruction from the base station. Chen is silent about transmitting this information at a different rate for a prescribed duration.

Referring now to the Examiner's responses to Appellants' previous arguments in conjunction with Chen's FIG. 7 and accompanying description (col. 11, line 40 to col. 14, line 20), Appellants respectfully submit that routine 300 described by Chen must be viewed in a larger context instead of any particular step in isolation. As described for step 320, data is "presented" to the base station for a high rate transfer to the mobile. Step 330 recites "tell the receiver to increase bandwidth of power control information about forward link". Note that Chen does not teach that data transmission occurs yet, but only that the base station and mobile are preparing for such data transmission by one instructing the other to increase the rate of sending power control information so that appropriate power adjustments can be made to support the subsequent data transmission. Subsequent steps, including step 360, describe the adjustments then made to the forward link (i.e., power) culminating in the subsequent data transmission from the base station to the mobile in step 380.

Step 360, in particular, recites "control the power level of the transmitter using low, full or high rates...to set the correct high rate power level for the transmitter". As described throughout the specification, Chen is referring specifically to the process that occurs before any

data transmission occurs, whether it's via the forward link from base station to mobile as described in the embodiments, or whether its via the reverse link as inferred by the Examiner in the Office Action. Accordingly, Chen does not disclose or even suggest varying the rate of channel quality feedback from the mobile to the base station as a function of the mobile receiving the data transmission from the base station. Instead, Chen only describes the base station receiving data for subsequent transmission to the mobile and, to prepare for such transmission, instructing the mobile to vary the rate of feedback (power control information) from the mobile to the base station so that appropriate power levels can be set at the base station before sending the data transmission to the mobile.

Appellants also respectfully disagree with the Examiner's interpretation and characterization of the teachings in Chen at col. *13,* lines 20-65 and lines 55-65 in particular. This portion of Chen (or any other portion for that matter) does not describe varying the rate for reporting channel quality information from a mobile to a base station as a function of the absence or detection, by the mobile, of a data transmission from the base station, contrary to the Examiner's assertion otherwise.

While Appellants might conditionally agree with the Examiner that Chen may disclose that a mobile [and base station] can estimate and then test the proper power level necessary to send data at a high rate, this disclosure in Chen simply reinforces the fact that Chen teaches a mobile and base station that exchanges and adjusts power control information (estimating, testing, etc) prior to actual high rate data transmissions between the mobile and the base station. This is different from Appellants' claimed invention in which the rate of the channel quality

information provided by the mobile is varied based on the presence or absence of data transmissions from the base station to the mobile.

Moreover, the cited portion of disclosure from Chen at col. 13, lines 20-65 (see lines 20-32 in particular), describe a completely different scheme than that being claimed by Appellants. For example, in this cited portion, Chen discloses that the base station stores a power level that was previously measured when data was previously sent and the base station simply recalls a previous power level for a subsequent data transmission. Here, Chen is not even describing varying the rate of any power control information feedback from the mobile to the base station.

With regard to the cited portion of Chen at col. 13, lines 33-40 discussing the situation of a transmission that is to occur via the reverse link from mobile to base station, Appellants again must disagree with the Examiner's characterization of the Chen teaching as being anticipatory of Appellants' claimed invention. Chen is describing a situation in which the reverse link is operating at idle (e.g., $1/8^{th}$ rate) and "data is received for transmission along the reverse link". Appellants submit that, upon careful reading and consistent with the entire disclosure in Chen, this statement simply refers to data being received at the mobile (e.g., from a user) for subsequent transmission along the reverse link (i.e., to the base station as the Examiner points out). That is, this embodiment refers somewhat to the converse of preceding embodiments, wherein here the mobile receives data for subsequent transmission to the base station (but not from the base station) and, in response, the mobile increases to the full rate thus increasing the feedback bandwidth to the base station. Again, this embodiment in Chen is still is not the same as a mobile, in response to a data transmission from the base station, varying the rate of channel quality feedback, as claimed by Appellants.

Finally, while the Examiner appropriately acknowledges that the teachings in Chen are primarily directed toward the control being effected on the base station side, Appellants do not agree with the inferences or conclusions being drawn with respect to the capabilities of a mobile station in the context of the Chen teachings. In particular, the Examiner states that, in the context of the Chen teachings, the mobile station can have "its own capability in detecting the status of the base station in order to request or adjust to the appropriate power levels necessary whether to send data or channel quality reports back to the base station at a low rate or at a high rate".

First, Appellants do not at all agree that Chen suggests this capability for a mobile (or a base station for that matter) and have respectfully invited the Examiner to specifically point out how the teachings in Chen support such an interpretation. Instead, Appellants submit that the capabilities of a mobile are more accurately summarized by what Appellants stated previously. That is, consistent with the teachings of Chen as a whole, the capabilities to infer for the mobile would be that, in preparation for a subsequent data transmission over the reverse link to a base station, that the mobile may adjust its rate of transmission of power control information to the base station. As stated previously by Appellants, this is quite different than a mobile adjusting its channel quality feedback based on the presence or absence of a data transmission from the base station (e.g., over the forward link).

Moreover, Appellants respectfully submit that such general and liberal extensions of the teachings in Chen are not only unsupported by the disclosure in Chen, but are also not sufficient to establish a case for anticipation in which each and every element of the claimed invention must be found in Chen, which Appellants believe not to be the case for all the reasons set forth hereinabove.

Because Chen fails to disclose or suggest each and every recited limitation in claims 1 and 11, Appellants submit that Chen cannot anticipate claims 1 and 11. Because claims 4-10 and 12 each depend from respective base claims 1 or 11, these dependent claims are therefore also believed to be allowable for the same reasons set forth above for claims 1 and 11 as well as for other novel features therein that are not disclosed by Chen.

For example, with regard to claim 8, Chen does not disclose or suggest estimated channel quality being used to derive a transmission format for a subsequent transmission, wherein the transmission format includes one or more parameters selected from modulation format, number of codes, and transmission rate. As previously discussed, Chen only teaches deriving the proper power level for a subsequent high-speed transmission. With regard to claim 9, Appellants respectfully disagree that the cited portions or any other portions of the Chen reference disclose or suggest a base station receiving channel quality information from a mobile, estimating channel quality therefrom, and then calculating an amount of redundancy for retransmissions accordingly. At most, Chen describes transmitting a new transmission to a mobile using a previously stored power level for the link. This teaching is not at all the same or even suggestive of using estimated channel quality to calculate an amount of redundancy for retransmission of a previous transmission as claimed by Appellants.

In view of the foregoing, Appellants submit that Chen fails to describe, either expressly or impliedly, each and every element of Appellants' claims. As such, Appellants' claims cannot be anticipated by Chen. Accordingly, Appellants respectfully request that the Board reverse the decision of the Examiner and grant allowance of claims 1 and 4-12.

IX. CONCLUSION

Accordingly, for at least the aforementioned reasons, Appellants respectfully request that the Honorable Members of the Board of Patent Appeals and Interferences reverse each of the outstanding rejections, and allow each of the pending claims in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No.08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

HARNESS, DICKEY, & PIERCE, P.L.C.

By: _____

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APPENDIX A

1. (Previously Presented) A method for transmitting channel quality information in a wireless communication system comprising at least one base station and at least one mobile station, the method comprising:

varying a rate for reporting channel quality information from a mobile station to a base station as a function of the presence or absence of a reception of a data transmission at the mobile station, wherein the mobile station reports channel quality information at a first rate in the absence of a reception of a data transmission from the base station and, upon detection of a reception of a data transmission from the base station, the mobile station reports channel quality information at a second rate for a prescribed duration.

2. (Cancelled)

3. (Cancelled)

4. (Previously Presented) The method according to claim 1, wherein, upon detection of a reception of a data transmission from the base station, the mobile station reports channel quality information at a plurality of rates over a prescribed time period after detection of the reception of a data transmission, wherein the plurality of rates are different than the first rate.

5. (Previously Presented) The method according to claim 4, wherein the prescribed time period includes a plurality of time intervals such that the channel quality information is reported at different ones of the plurality of rates during different ones of the plurality of time intervals.

6. (Previously Presented) The method according to claim 1, wherein the second rate is faster than the first rate.

7. (Previously Presented) The method according to claim 1, further comprising the step of estimating channel quality at the base station while the mobile station is reporting at the second rate, wherein estimated channel quality is used to derive a transmission format for a subsequent transmission.

8. (Original) The method according to claim 7, wherein the transmission format includes one or more parameters selected from the group consisting of modulation format, number of codes, and transmission rate.

9. (Previously Presented) The method according to claim 1, further comprising the step of estimating channel quality at the base station while the mobile station is reporting at the second rate, wherein estimated channel quality is used to calculate an amount of redundancy needed for a retransmission of a previous data transmission.

10. (Original) The method according to claim 1, wherein the channel quality information comprises a transmission rate calculated by the mobile station based on one or more channel conditions.

11. (Previously Presented) A method for adapting the rate of reporting channel quality information in a wireless communication system including at least one base station and at least one mobile station, the method comprising:

reporting channel quality information from the at least one mobile station to the at least one base station at a first rate in the absence of a reception of a data transmission at the at least one mobile station; and

in the presence of a reception of a data transmission at the at least one mobile station, adapting the rate for reporting channel quality information from the at least one mobile station to the at least one base station from the first rate to a second rate for a prescribed duration.

12. (Original) The method according to claim 11, wherein the second rate is faster than the first rate.

13. (Original) A method for transmitting channel quality information in a wireless communication system including at least one base station and at least one mobile station, the method comprising:

varying a rate for reporting channel quality information from a mobile station to a base station as a function of the number of base stations that the mobile station is communicating with.

14. (Original) The method according to claim 13, wherein the mobile station reports channel quality information at a first rate when the mobile station is communicating with one base station and wherein the mobile station reports channel quality information at a second rate when the mobile station is communicating with a plurality of base stations.

15. (Original) The method according to claim 14 wherein the second rate is faster than the first rate.

FIG. 1

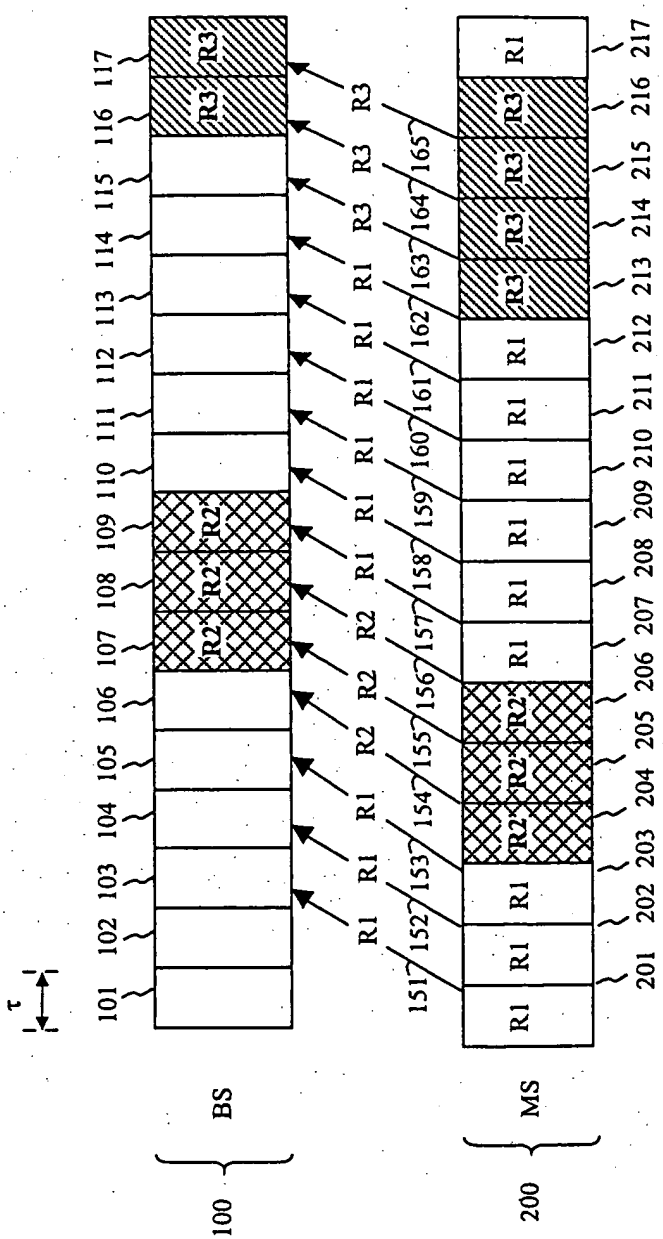


FIG. 2

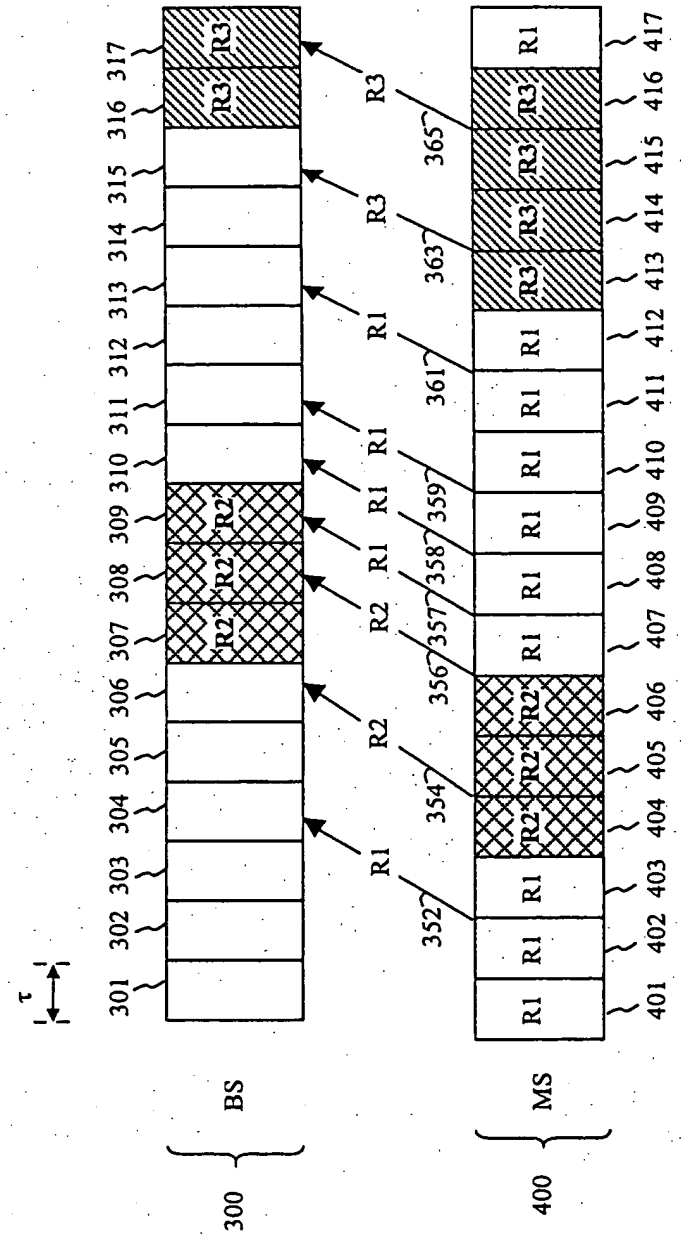
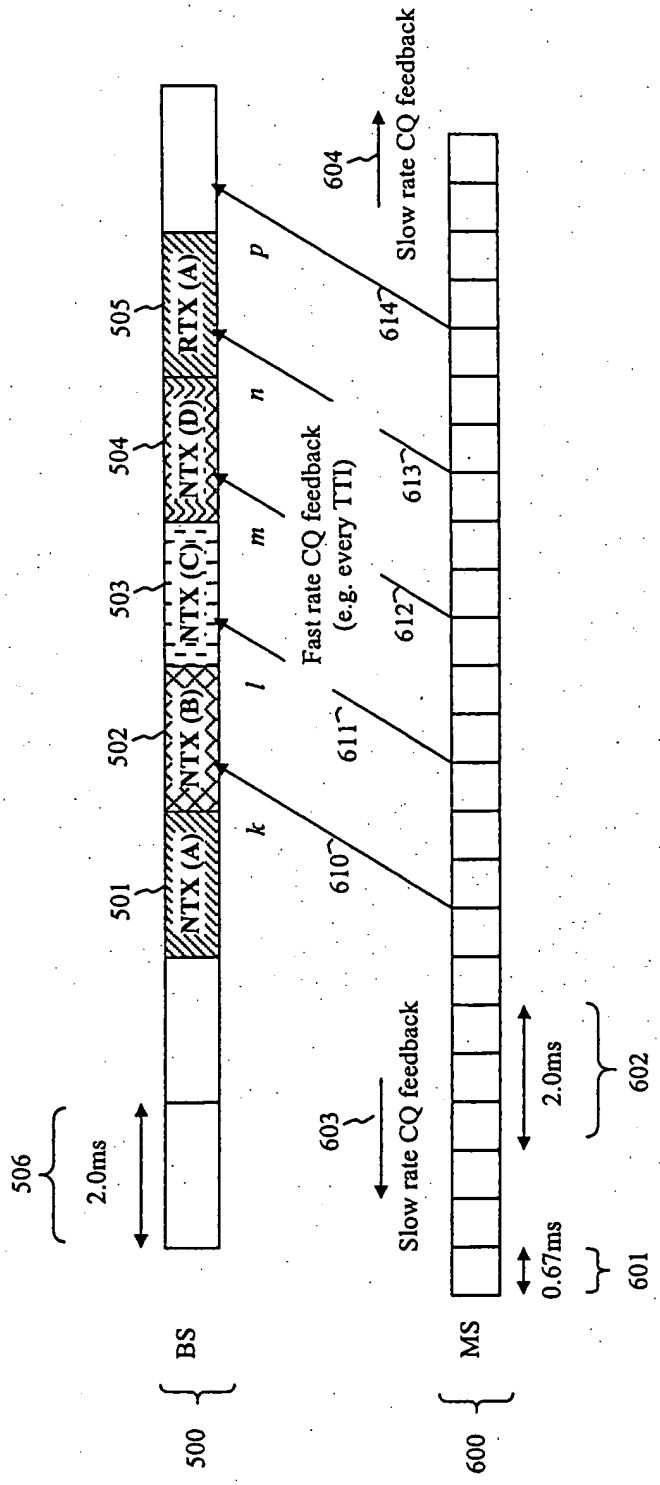


FIG. 3



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Inventors	Arnab Das Farooq Ullah Khan
Case	14-18
Serial No.	10/002,746
Filing Date	November 2, 2001
Examiner	Thuan T. Nguyen
Group	2685
Title	Variable Rate Channel Quality Feedback in a Wireless Communication System

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Sir:

In response to the Office Action dated October 2, 2003, please enter the following amendments and remarks in the above-identified application, in which:

Amendments to the claims begin on page 2 of this paper; and

Remarks begin on page 5 of this paper.

In the Claims

Please substitute the following claims for those currently on file in the application:

1. (Currently Amended) A method for transmitting channel quality information in a wireless communication system comprising at least one base station and at least one mobile station, the method comprising:

varying a rate for reporting channel quality information from a mobile station to a base station as a function of the presence or absence of a reception of a data transmission at the mobile station, wherein the mobile station reports channel quality information at a first rate in the absence of a reception of a data transmission from the base station and, upon detection of a reception of a data transmission from the base station, the mobile station reports channel quality information at a second rate for a prescribed duration.

2. **(Canceled)**

3. **(Canceled)**

4. (Currently Amended) The method according to claim 1, wherein ~~the mobile station reports channel quality information at a first rate in the absence of a reception of a transmission from the base station and~~, upon detection of a reception of a data transmission from the base station, the mobile station reports channel quality information at a plurality of rates over a prescribed time period after detection of the reception of a data transmission, wherein the plurality of rates are different than the first rate.

5. (Currently Amended) The method according to claim 4, wherein the prescribed time period includes a plurality of time intervals such that the channel quality information is reported at different ones of the plurality of rates during different ones of the plurality of time intervals.

6. (Currently Amended) The method according to claim ~~2~~ 1, wherein the second rate is faster than the first rate.

7. (Currently Amended) The method according to claim ~~6~~ 1, further comprising the step of estimating channel quality at the base station while the mobile station is reporting at the second rate, wherein estimated channel quality is used to derive a transmission format for a subsequent transmission.

8. (Original) The method according to claim **7**, wherein the transmission format includes one or more parameters selected from the group consisting of modulation format, number of codes, and transmission rate.

9. (Currently Amended) The method according to claim ~~6~~ **1**, further comprising the step of estimating channel quality at the base station while the mobile station is reporting at the second rate, wherein estimated channel quality is used to calculate an amount of redundancy needed for a retransmission of a previous data transmission.

10. (Original) The method according to claim **1**, wherein the channel quality information comprises a transmission rate calculated by the mobile station based on one or more channel conditions.

11. (Currently Amended) A method for adapting the rate of reporting channel quality information in a wireless communication system including at least one base station and at least one mobile station, the method comprising:

reporting channel quality information from the at least one mobile station to the at least one base station at a first rate in the absence of a reception of a data transmission at the at least one mobile station; and

in the presence of a reception of a data transmission at the at least one mobile station, adapting the rate for reporting channel quality information from the at least one mobile station to the at least one base station from the first rate to a second rate for a prescribed duration.

12. (Original) The method according to claim **11**, wherein the second rate is faster than the first rate.

13. (Original) A method for transmitting channel quality information in a wireless communication system including at least one base station and at least one mobile station, the method comprising:

varying a rate for reporting channel quality information from a mobile station to a base station as a function of the number of base stations that the mobile station is communicating with.

14. (Original) The method according to claim **13**, wherein the mobile station reports channel quality information at a first rate when the mobile station is communicating with one base station and wherein the mobile station reports channel quality information at a second rate when the mobile station is communicating with a plurality of base stations.

15. (Original) The method according to claim **14** wherein the second rate is faster than the first rate

REMARKS

By this amendment, claims 1, 4-7, 9 and 11 have been amended and claims 2-3 have been canceled. Accordingly, claims 1 and 4-15 are still pending in the application for further consideration by the Examiner.

35 U.S.C. 102(b) Rejection

Claims 1-15 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,067,458 ("Chen"). Claims 1, 4-7, 9 and 11 have been amended, claims 2-3 have been canceled, and all rejections of the remaining claims are respectfully traversed as set forth below.

Claims 1-12

Briefly, the Chen reference appears to be directed to controlling the power level of transmissions between base stations and mobile stations and, in particular, to controlling power for higher rate data transmissions. Applicants acknowledge that Chen describes and it is well known for a mobile station to send power control information (e.g., messages) to a base station corresponding to the measured power level received at the mobile station. Furthermore, Applicants acknowledge that Chen describes how a variable rate vocoder is used to transmit voice and/or data at a plurality of rates over a link, e.g., col. 6, lines 10 et seq.

However, Applicants respectfully submit that Chen does not teach or suggest every limitation set forth in Applicants' claims and, as such, does not anticipate Applicants' claims. Applicants' claim 1, as amended, recites that the mobile station reports channel quality information at a first rate in the absence of a reception of a data transmission from the base station and, upon detection of a reception of a data transmission from the base station, the mobile station reports channel quality information at a second rate for a prescribed duration. Independent claim 11 recites similar limitations.

Chen is only concerned with power control and, as such, only describes a mobile station transmitting power control information to a base station, wherein power control information is characterized throughout the specification as either a signal corresponding to the measured power level, a signal or message indicating that the power level deviated from a predefined threshold, or other similar variations of communicating the power information. By contrast, Applicants' independent claims 1 and 11 each recite the mobile station reporting channel quality information to the base station, which Applicants respectfully submit is different than power control information. While the Office Action references one statement in Chen (e.g., col. 14, lines 35-39) in which the patentee obliquely mentions that the invention would be applicable to a "communication system that operates in accordance with the claims to provide channel quality monitoring and power control", Applicants respectfully submit that this statement alone does not

supply an anticipatory and enabling teaching for a mobile station reporting channel quality information in the manner in which it is now being claimed by Applicants.

Notwithstanding at least the above distinction, Applicants respectfully submit that Chen also fails to teach or suggest varying the rate for reporting channel quality information from a mobile station as a function of the absence or detection of a data transmission from the base station.

In FIG. 7 and the accompanying description in col. 11, lines 35 et seq., Chen describes a routine for changing power levels for sending data at a high rate after sending data at one of the low rates. More specifically, Chen describes the base station operating at an idle rate, e.g., sending no voice/data to the mobile. After data is "presented to the base station" for a high rate transfer to the mobile (col. 11, lines 49-50), the base station (step 330, FIG. 7) first sends a signal to the mobile station to increase the bandwidth of the power control information transmitted by the mobile (col. 11, lines 64-67). According to Chen, increasing power control bandwidth causes power control information to be sent at a higher rate from the mobile (col. 11, line 67 to col. 12, line 3). More specifically, Chen clearly discloses that the base station sends an encoded signal to the mobile, which then decodes the signal and, in response thereto, increases the bandwidth of its power control information, e.g., by transmitting one or more power control messages per several frames (col. 12, lines 3-13). Chen describes that this increased power control information is necessary to predict the power needed to then subsequently transmit data at the higher data rate (col. 12, lines 14-62).

Again, in col. 13, lines 48 to col. 14, line 41, Chen describes generally that the routine shown in FIG. 7 allows the mobile and base station to estimate and test the proper power level before sending data at a higher rate and, in particular, that the transmission rate of power control information can be increased from the mobile so that the base station can estimate the proper power level for transmitting subsequent frames of data at high rates to the mobile. Consequently, all teachings in Chen describe increasing power control feedback from the mobile based on the base station sending a message or signal instructing such action in preparation for a subsequent high data rate transmission.

By contrast, Applicants' claimed invention sets forth a mobile station that changes its rate of transmitting channel quality information based on the mobile's detection of the absence or presence of a data transmission from the base station. That is, the mobile station receives a data transmission from the base station and, in response thereto, begins transmitting channel quality information back to the base station at a second rate. Using the actual data transmission from the base station as a trigger for the mobile station to change its rate of transmitting channel

quality information back to the base station is quite different from using a separate signaling message from the base station to the mobile telling the mobile to transmit more power control information (i.e., so that the base station can then adjust power for the subsequent higher speed data transmission) as described by Chen.

Furthermore, Applicants respectfully submit that neither the cited portion of Chen (col. 6, lines 18-48) nor any other portion of the reference teaches or suggests a mobile station that, upon detection of a reception of a data transmission, reports channel quality information at a second rate for a prescribed duration. In particular, Chen only teaches that the bandwidth, and hence the rate of transmission, of power control information from the mobile station is increased in response to the instruction from the base station. Chen fails to teach or suggest transmitting this information at a different rate for a prescribed duration.

Among other advantages, transmitting channel quality information at a second rate for a prescribed duration as set forth in Applicants' claims addresses the problem of delay with respect to uplink transmissions (from the mobile) and downlink transmissions (from the base station). In particular, there is delay with respect to the calculation of rate information by the mobile during a time slot and the subsequent reporting of that rate (vis-à-vis channel quality feedback) to the base station, *see, e.g.,* Applicants' specification on page 2, line 8-33. By way of example, this delay can cause problems in adapting the rate of channel quality feedback (and subsequent changes to transmission rate), especially when dealing with the bursty nature of data traffic (e.g., all packets may not come at once or in immediate succession). In particular, reporting channel quality information at a second rate for a prescribed duration as claimed by Applicants will solve the problem of undesirable (e.g., premature) switching back and forth between rates just because there may be some gaps in packet transmission. By maintaining transmission of channel quality information at a second rate for a prescribed duration as claimed by Applicants, insignificant gaps in packet transmission will not trigger an unnecessary switch in the feedback rate (*see, e.g.,* Applicants' specification, page 6, line 26 through page 7, line 27). Applicants respectfully submit that there are no such teachings in Chen.

Because Chen fails to teach or suggest every recited limitation in claims 1 and 11 (as amended), Applicants submit that Chen therefore does not anticipate claims 1 and 11 and respectfully request that the Examiner withdraw the rejections accordingly.

Because claims 4-10 and 12 each depend from respective base claims 1 or 11, these dependent claims are therefore also believed to be allowable for the same reasons set forth above for claims 1 and 11 as well as for other novel features therein.

With regard to claim 8, for example, Chen does not teach or suggest estimated channel quality being used to derive a transmission format for a subsequent transmission, wherein the transmission format includes one or more parameters selected from modulation format, number of codes, and transmission rate. As previously discussed, Chen only teaches deriving the proper power level for a subsequent high-speed transmission. That is, the base station receives a data transmission that is to be transmitted at a higher rate (defined *a priori*) and, upon receiving the power control information from the mobile station, the base station then adjusts the power level to a proper level for transmission of the higher rate data transmission. As such, there is no teaching in Chen for deriving modulation format, number of codes, and/or transmission rate for a subsequent transmission after estimating channel quality based on feedback from the mobile, as is now being claimed by Applicants.

With regard to claim 9, Applicants respectfully disagree that the cited portions or any other portions of the Chen reference teach or suggest a base station receiving channel quality information from a mobile, estimating channel quality therefrom, and then calculating an amount of redundancy for retransmissions accordingly. At most, Chen describes transmitting a new transmission to a mobile using a previously stored power level for the link. This teaching is not at all the same or even suggestive of using estimated channel quality to calculate an amount of redundancy for retransmission of a previous transmission as claimed by Applicants.

Claims 13-15

Applicants also respectfully submit that Chen does not teach or suggest every limitation recited in independent claim 13. The distinctions noted above for the Chen reference and Applicants' claims 1 and 11, relating to channel quality information as claimed by Applicants versus power control information as disclosed by Chen, apply equally to claim 13 and will not be repeated here for sake of brevity. Furthermore, there are absolutely no teachings in Chen, nor are any cited in the Office Action, that either expressly or impliedly suggest varying the rate for reporting channel quality information as a function of the number of base stations that the mobile is communicating with, as is recited in Applicants' claim 13. This feature of Applicants' claimed invention, which is particularly advantageous for handling "soft handoffs", is supported in Applicants' specification, see, e.g., page 9, lines 1-22.

Because Chen does not teach or suggest each of the limitations recited in claim 13, Applicants' submit that the Chen reference therefore does not anticipate claim 13 and respectfully request that the Examiner withdraw the rejection accordingly. Because claims 14 and 15 depend from claim 13, these dependent claims are therefore also believed to be

allowable for the same reasons set forth above for claim 13 as well as for other novel features therein.

Conclusion

In view of the foregoing, Applicants believe that all pending claims stand in condition for allowance. Accordingly, Applicants respectfully request reconsideration of the application and passage of the case to issue. Any questions can be directed to the Applicants' attorney at the number below.

Respectfully submitted,

By: _____

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Lucent Technologies Inc.
Date: 2/2/04